

CLAIM LISTING

CLAIMS

We claim:

1. (Amended) A method of chemical synthesis of stable isotope labeled internal standards and chemical reaction for the purpose of identification and quantification of [aldehyde(s)] aldehydes and/or [ketone(s)] ketones in a sample comprising the steps of
 - a) synthesizing isotopically labelled oxime internal standards from authentic samples of said aldehydes and said ketones and from an isotopically labeled alkoxyamine reagent;
 - b) combining a known amount of [an] said oxime internal standards with said sample comprising said aldehydes and/or ketones;
 - c) contacting said sample with an alkoxyamine to convert said aldehydes and/or ketones in said sample into an oximes of identical structure as that of said oxime internal standards except for the stable isotope atoms;
 - d) [extracting said sample to isolate] isolating said oximes and said oxime internal standards by aqueous extraction;
 - e) analyzing said oximes and said oxime internal standards by mass spectrometry.
2. (Amended) The method of claim 1 wherein said mass spectrometric method is the [isotope dilution] mass spectrometric method using isotope labeled oxime internal standards.
3. (Amended) The method of claim 1 wherein said aldehydes and/or ketones [is an aldehyde and/or ketone having] have the following formulas R_1CHO [or] and $R_1R_2CO_2$

respectively, wherein R_1 and R_2 are alkyl, aryl, and heteroatom containing cyclic or non-cyclic groups.

4. (Amended) The method of claim 1 wherein said oxime internal standards [is a] are stable isotope labeled internal standards.

5. (Amended) The method of claim 1 wherein said oxime internal standards [is] are synthesized by reacting an authentic sample of said aldehydes and/or ketones with a stable isotope labeled alkoxylamine reagent to form said oxime internal standards having the following formula $R_1CH=NOR_3$ or $R_1R_2C=NOR_3$, wherein R_1 and R_2 are alkyl, aryl, and heteroatom containing cyclic or non-cyclic groups and R_3 is a stable isotope labeled alkyl group.

6. (Amended) The method of claim 5 wherein said labeled group R_3 is selected from a group consisting of CD_3 and C_6D_5 , formed by reacting said aldehyde and/or ketone with labeled alkoxylamine selected from a group [comprising] consisting of labeled methoxylamine and labeled benzyloxyamine.

7. (Amended) The method of claim 1 wherein said aqueous extraction in step [c] d) can be any appropriate separating methods such as solid phase extraction, liquid-liquid extraction or solid supported liquid-liquid extraction.

8. (Original) The method of claim 1 wherein said alkoxylamine is selected from a group consisting of methoxylamine and benzyloxyamine.

9. (Amended) The method of claim 1 wherein said sample contains either a singularity or a plurality of aldehyde and/or ketone.

10. (Original) The method of claim 1 wherein said multiple aldehydes and/or ketones can be converted to said oximes using a single alkoxylamine.

11. (Original) The method of claim 1 wherein said multiple labeled oxime internal standards can be synthesized from said aldehydes and/or ketones using a single labeled alkoxyamine.
12. (Amended) The method of claim 1 wherein there is no conversion of said stable isotope labeled oxime internal standards to [its] their corresponding non-labeled oxime compound during step [b] c).
13. (Amended) The method of claim 1 wherein said converting step [b] c) is performed in an aqueous environment.
14. (Amended) The method of claim 1 wherein said converting step [b] c) is performed before said extraction step d).
15. (Amended) The method of claim 1 wherein said converting step [b] c) is quantitative.
16. (Amended) A method of chemical synthesis of stable isotope labeled internal standards and chemical reaction for the purpose of identification and quantification of [aldehyde(s)] aldehydes and /or [ketone(s)] ketones in a sample comprising the steps of:
- a) synthesizing isotopically labelled hydrazone internal standards from authentic samples of said aldehydes and said ketones and from an isotopically labeled alkylhydrazine reagent;
- b) combining a known amount of [a] said hydrazone internal standards with said sample comprising said aldehydes and/or ketones ;
- c) contacting said sample with an alkylhydrazine to convert said aldehydes and/or ketones in said sample into [a] hydrazones of identical structure as that of said hydrazone internal standards except for the stable isotope atoms;

d) [extracting said sample to isolate] isolating said hydrazones and said hydrazone internal standards by aqueous extraction; and

e) analyzing said hydrazones and said hydrazone internal standards by mass spectrometry.

17. (Amended) The method of claim 16 wherein said mass spectrometric method is the [isotope dilution] mass spectrometric method using isotope labeled hydrazone internal standards.

18. (Amended) The method of claim 16 wherein said aldehydes and [/or] ketones [is an aldehyde and/or ketone having] have the following formulas R_1CHO and R_1R_2CO , respectively, wherein R_1 and R_2 are alkyl, aryl, and heteroatom containing cyclic or non-cyclic groups.

19. (Amended) The method of claim 16 wherein said hydrazone internal standards [is a] are stable isotope labeled internal standards.

20. (Amended) The method of claim 16 wherein said hydrazone internal standards [is] are synthesized by reacting an authentic sample of said aldehydes and/or ketones with a stable isotope labeled alkylhydrazine reagent to form said hydrazone internal standards having the following formula $R_1CH=NNHR_3$ or $R_1R_2C=NNHR_3$, wherein R_1 and R_2 are alkyl, aryl, and heteroatom containing cyclic or non-cyclic groups and [where] R_3 is a stable isotope labeled alkyl group.

21. (Amended) The method of claim 20 wherein said labeled group R_3 is selected from a group consisting of CD_3 and C_6D_5 , formed by reacting said aldehydes and/or ketones with labeled alkylhydrazine selected from a group [comprising] consisting of labeled methylhydrazine and labeled benzylhydrazine.

22. (Amended) The method of claim 16 wherein said aqueous extraction in step [c] d) can be any appropriate separating methods such as solid phase extraction, liquid-liquid extraction or solid supported liquid-liquid extraction.

23. (Original) The method of claim 16 wherein said alkylhydrazine is selected from a group consisting of methylhydrazine and benzylhydrazine.

24. (Original) The method of claim 16 wherein said sample contains either a singularity or a plurality of aldehyde and/or ketone.

25. (Original) The method of claim 16 wherein said multiple aldehydes and/or ketones can be converted to said hydrazones using a single alkylhydrazine.

26. (Original) The method of claim 16 wherein said multiple labeled hydrazone internal standards can be synthesized from said aldehydes and/or ketones using a single labeled alkylhydrazine.

27. (Amended) The method of claim 16 wherein there is no conversion of said stable isotope labeled hydrazone internal standards to [its] their corresponding non-labeled hydrazone compound during said converting step [b] c).

28. (Amended) The method of claim 16 wherein said converting step [b] c) is performed in an aqueous environment.

29. (Amended) The method of claim 16 wherein said converting step [b] c) is performed before said extraction step d).

30. (Amended) The method of claim 16 wherein said converting step [b] c) is quantitative.